GEOTECHNICAL ENGINEERING REPORT
New Fire Station No. 21
NEC of International & Maple Avenues
Fresno, California

BSK 01-21-0051

Prepared for
City of Fresno Public Works Department
2600 Fresno Street, 4th Floor
Fresno, CA 93721

December 9, 2002

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567 W. Shaw Ave., Ste. B
Fresno, CA 93704
(559) 497-2880
FAX (559) 497-2886

December 9, 2002

BSK JOB 01-21-0051

Mr. Robert K.Kishi
Project Manager
City of Fresno, Department of Public Works
2600 Fresno Street, 4th Floor
Fresno, CA 93721

SUBJECT: **Geotechnical Engineering Report**
New Fire Station No. 21
NEC of International & Maple Avenues
Fresno, California

Dear Mr. Kishi:

BSK, Inc. has conducted a geotechnical investigation at the subject site on behalf of City of Fresno Department of Public Works (Owner, Client). The geotechnical investigation was conducted in accordance with BSK's Proposal 01-21-0051, dated October 15, 2002.

The enclosed report contains the results of BSK's geotechnical investigation that includes field exploration, laboratory testing, and engineering analysis, and provides recommendations for use in preparation of plans and specifications for the subject project.

Please call if you have questions or comments concerning the report. We appreciate the opportunity to be of service to City of Fresno Department of Public Works.

Respectfully submitted,
BSK Associates

REGISTERED PROFESSIONAL ENGINEER
JOSUE A. MONTES, JR.
No. C52610
Exp. 12-31-02
CIVIL
STATE OF CALIFORNIA

Josue A. Montes, Jr., P.E.
Senior Project Engineer

REGISTERED PROFESSIONAL ENGINEER
JOHN M. MINNEY
No. 602
Exp. 06/30/05
GEOTECHNICAL
STATE OF CALIFORNIA

John M. Minney, G.E.
Senior Geotechnical Engineer

JAM/JMM/jam
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Figure 1 - Site Plan

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GEOTECHNICAL ENGINEERING REPORT
NEW FIRE STATION NO. 21
NEC OF INTERNATIONAL & MAPLE AVENUES
FRESNO, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation conducted by BSK Associates for the proposed Fire Station No. 21 located on the northeast corner of North Maple Avenue and International Avenue, in Fresno, California. BSK was retained as the geotechnical engineering consultant by City of Fresno Department of Public Works (Project Architect, Client). BSK's contact was Mr. Robert Kishi, Project Manager.

2.0 PLANNED CONSTRUCTION

BSK's understanding of the planned construction was based on information provided by Mr. Kishi, which included faxed copy of the site drawing. The planned construction will consist of a single-story masonry and steel framed structure with slab-on-grade. Project site may require several feet of cut/fill to develop building pad and parking grades. The fire station will be about 13,200 square feet in size. Entrance drives for the fire trucks will consists of portland cement concrete paving and automobile parking areas will consist of asphalt concrete. Masonry screen walls will be installed around the existing water pump station with an anticipated height of 8 feet. BSK assumes that structural loads (dead load plus live load, DL+LL) will not exceed 150 kips column load and 3 kips per lineal foot wall load.

In the event that changes occur in the design of the project, this report's conclusions and recommendations will not be considered valid unless the changes are reviewed with BSK and the conclusions and recommendations are modified or verified in writing. Examples of such changes would include location, size of building, foundation loads, etc.

3.0 OBJECTIVE AND SCOPE OF INVESTIGATION

The objective and scope of the geotechnical investigation were set forth in BSK's Proposal 01-21-0051 dated October 15, 2002, which was authorized by Mr. Kishi. The objective was to characterize the subsurface conditions in the area of the planned construction and to provide geotechnical engineering recommendations. The scope of the investigation included field exploration, laboratory testing, engineering analysis, and preparation of this report.

4.0 FIELD EXPLORATION

The field exploration was conducted on November 6, 2002, under the oversight of a BSK senior project engineer. Three borings were drilled within the building footprint and two borings at the parking area, as indicated on the Boring Location Map, Figure 2. One of the borings extended to a depth of 50.5 feet below existing ground surface (bgs), and the other borings were excavated to depths of 25.5 feet. Details of the field exploration and the boring logs are presented in Appendix A.

5.0 LABORATORY TESTING

Laboratory tests were performed on selected samples to evaluate relevant engineering soil properties. Laboratory tests included moisture content, dry density, direct shear strength, consolidation, R-Value, expansion index, and soil corrosivity tests. The laboratory testing methods and some test results are summarized in Appendix B.

6.0 SITE CONDITIONS

The following sections address site description, surface and subsurface conditions, and groundwater conditions. These are presented based on BSK's field exploration, information provided above, and published maps and reports.

6.1 Site Description and Surface Conditions

At the time of BSK's field exploration, the proposed project site was vacant and unpaved. A pump station occupies the north end; some soil material stockpile and removed asphalt concrete chunks were present. A power pole with lines are at the southwest corner. The site was an formerly an orchard farm; International Avenue is at its south and North Maple Avenue is at its west.

The topographic map obtained from the website http://terraserver.homeadvisor.msn.com indicated topographic contours at the site with a relatively flat surface with an elevation of about 390 feet above mean sea level (MSL).

6.2 Subsurface Soil Conditions and Groundwater

Subsurface soils encountered in the borings consisted primarily of medium dense to dense silty sands up to depths of about 8 to 15 feet bgs, which were underlain by medium dense to dense to very dense, fine to medium grained sands with gravel. "Hardpan" soils were encountered in some of the borings at depths as shallow as 2 feet. The boring logs in

Appendix A provide a more detailed description of the soils encountered, including the applicable Unified Soil Classification System symbol.

Based on this year's records available from California Department of Water Resources website (www.well.ca.gov), groundwater in the vicinity is greater than 100 feet deep below ground surface (Well No. 12S20E13E001M). However, the possibility of the groundwater rising to shallower depths below ground surface may occur due to seasonal effects or other factors not evident at the time of the investigation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering standpoint, it is BSK's opinion that the site is suitable for the proposed construction. This opinion is based upon the data collected during this investigation, BSK's understanding of the planned improvements as described above, and the recommendations presented herein being properly incorporated into the project design and construction.

As suggested by the existing site grade, finished floor elevations will require some minor grading. "Hardpan" soils were encountered in some of the borings at shallow depths, which could mean encountering this type of soils during grading.

7.1 Seismic Design Criteria

BSK has prepared a Geologic and Seismic Hazards Assessment in a separate report dated December 9, 2002. In BSK's opinion there are no unique geologic factors at the site which would necessitate special seismic consideration for the design of the planned building improvements. Based on BSK's investigation, no known active or potentially active fault zones are within 15 miles of the project site and the site lies within Seismic Zone 3. Use of the 1998 California Building Code (CBC) seismic design criteria is considered appropriate, unless the project design consultant requires more specific data such as an elastic response spectra or characteristic site period. The following parameters, which are based on the 1998 CBC, are considered appropriate for the structural design of the planned improvements.

Seismic Zone Factor, Z = 0.30
Soil Profile Type is S_D
Seismic Coefficient C_a = 0.36
Seismic Coefficient C_v = 0.54

7.2 Site Preparation and Grading

The following procedures should be implemented during site preparation and earthwork for the proposed improvements. It should be noted that all references to moisture content and percent relative compaction are based on optimum moisture content and maximum dry density as determined by the ASTM D 1557 laboratory test procedure.

1) Trash, debris, fill material, and the near-surface soils containing objectionable organic matter should be stripped and hauled off site or used in landscape areas. BSK should be contacted to observe such excavations to verify whether soft or loose soils, or other buried features are present that would require additional excavation.

2) All existing buried utility lines and subterranean structures, if located beneath the area of planned construction, should be removed and relocated to a distance of at least 5 feet outside the area of the planned improvements. All resultant cavities should be widened to provide sidewalls with slopes as discussed below in Excavation Stability and then backfilled with compacted engineered fill.

3) Prior to the replacement of any fill, the bottom of the excavation should be scarified to a depth of 6 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90 percent. Excavated soils should be replaced as compacted engineered fill up to the desired foundation bottom elevation. All engineered fill should be placed in uniform layers not exceeding 8 inches in loose thickness, moisture conditioned to within 2 percent of optimum moisture content, and compacted to at least 90 percent.

4) All engineered fill materials should be free from organic materials or deleterious substances. Soils imported for use as engineered fill should consist of predominantly granular material, and conform to the following criteria:

Maximum Plasticity Index:	8
Maximum Particle Size:	3"
Percent Passing #200 Sieve:	10 - 40
Non-Hazardous	
Non- to Low-Expansive	
Non- to Low-Corrosive	

BSK should be contacted for review of proposed engineered fill materials for conformance with these recommendations prior to hauling to from the borrow areas.

7.3 Excavation Stability

Soils encountered within the depth of the proposed improvements are generally soil Type B in accordance to OSHA (Occupational Safety and Health Administration). Slope height,

slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations, (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations) unless stated otherwise herein. Variations in soil conditions will likely be encountered during excavation. BSK must be afforded the opportunity to provide field review to evaluate actual conditions and account for field condition variations not otherwise anticipated in the preparation of these recommendations.

Temporary excavations for the project construction should be left open for as short a time as possible and should be protected from runoff.

7.4 Surface Drainage Control

The control of surface drainage within the area of the planned improvements is an important design consideration. BSK recommends that the final grading around the new construction should provide for positive and enduring drainage away from the structures, and ponding of water should not be allowed near the structures.

7.5 Foundations

Provided that the site is prepared as recommended above, the building may be supported on conventional footing foundation bearing on suitable native soil. The foundation should have a minimum depth of 18 inches below finished grade. This foundation, constructed as recommended herein, may be designed using an allowable bearing pressure of 5000 pounds per square foot (psf). This value applies to the dead load plus live load (DL plus LL) condition and may be increased by 1/3 for short duration wind or seismic loads.

For design purposes, maximum total settlements on the order of ½ inch are anticipated for the foundation, based upon the foundation loads and upon the above allowable bearing pressures and subgrade requirements.

An equivalent fluid pressure (EFP) of 430 pcf for passive earth pressure, 28 pcf for active pressure and 37 pcf for at-rest pressure may be used. A coefficient of friction of 0.45 may be used between soil subgrade and concrete mat. These values represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage. For stability against lateral sliding that is resisted solely by the passive pressure, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive and frictional resistance, a minimum

safety factor of 2.0 is recommended. For lateral stability against seismic loading conditions, a minimum safety factor of 1.2 is recommended.

7.6 Soil Corrosivity

A composite soil sample, obtained from Boring B-3 at depths of 0 to 4 feet bgs, was analyzed to evaluate the potential for concrete deterioration or steel corrosion due to attack by soluble salts in the on-site soils. The test results (see Appendix B) indicate that on-site, near-surface soils are neutral and have a minimal corrosive attack potential on buried steel and concrete members. We recommend that Type II cement be used in the formulation of concrete, that buried reinforcing steel be covered with a minimum of 3 inches of cover, and that buried pipe have a protective coating.

7.7 Pavement Thickness Design

The R Value determination is included in Appendix B. The R-value was 25. For the heavy traffic areas, a Traffic Index of 7.0 is recommended. For auto parking areas, a Traffic Index of 4.5 is recommended.

All fill should be compacted to a minimum of 90% per ASTM D1557, except the top 8 inches below pavement sections which should be compacted to 95%.

The following pavement sections are recommended.

	Heavy Traffic TI=7.0	**Car Parking TI=4.5**
Asphaltic Concrete, Caltrans Type B	*3 inches*	*2 inches*
Caltrans Class II Base, 95% Compaction	*12 inches*	*7 inches*
Native or import subgrade, 95% Compaction	*8 inches*	*8 inches*

7.8 Concrete Slab-on-Grade Design

In building areas, we recommend that non-structural interior concrete slabs-on-grade be underlain by a vapor retarder membrane. The membrane should be made of high density polyethylene (HDPE) and have a 20 mil thickness. The membrane should be carefully sealed at penetrations and joints. HDPE embedment strips should be used to tie the membrane to perimeter and interior footings and walls. Waterproofing of all joints and connections should be tested following installation.

A layer of washed concrete sand (ASTM C33) 1-1/2 inches in thickness may be placed over the membrane for protection and for absorbing excess water in freshly placed concrete. The sand layer should terminate 1 (one) foot short of walls or be wrapped by encapsulation with the vapor barrier membrane within 1 (one) foot of the wall to isolate the sand layer from contact with exterior walls.

The excess moisture entrapped in the sand layer will generate moisture vapor transmission through the concrete floor slab. Sufficient time should be allowed for moisture vapor transmission in floor areas destined to receive moisture-sensitive flooring. The flooring manufacturer's recommendations should be followed for the permissible residual moisture at the time of flooring installation.

The control of the deleterious effects of moisture vapor transmission on floor materials can be substantially improved by the use of low porosity concrete. This can be achieved by specifying a low water/cement ratio (0.45 to 0.49 by weight), 4,000 psi compressive strength at 28 days, a minimum of 7 days wet-curing and the substitution of flyash for approximately 40 percent of the Portland Cement used in the concrete mix. BSK should be called to the site to review soil and moisture conditions immediately prior to slab placement.

8.0 PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations and earthwork, prior to their being finalized and issued for construction bidding.

9.0 CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction are a vital extension of the geotechnical investigation. BSK recommends that it be retained for those services. Field review during site preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK observations should be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. BSK should also be called to the site to observe foundation excavations, prior to placement of reinforcing steel or concrete, in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. BSK should also be called to the site to observe placement of foundation and slab concrete.

If a firm other than BSK is retained for these services during construction, that firm should notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the project geotechnical engineer. Notification should indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendation, or that it will provide independent recommendations.

10.0 CHANGED CONDITIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the test boring performed at the locations shown on the Site Plan, Figure 1. The report does not reflect variations which may occur around the boring. The nature and extent of such variations may not become evident until construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

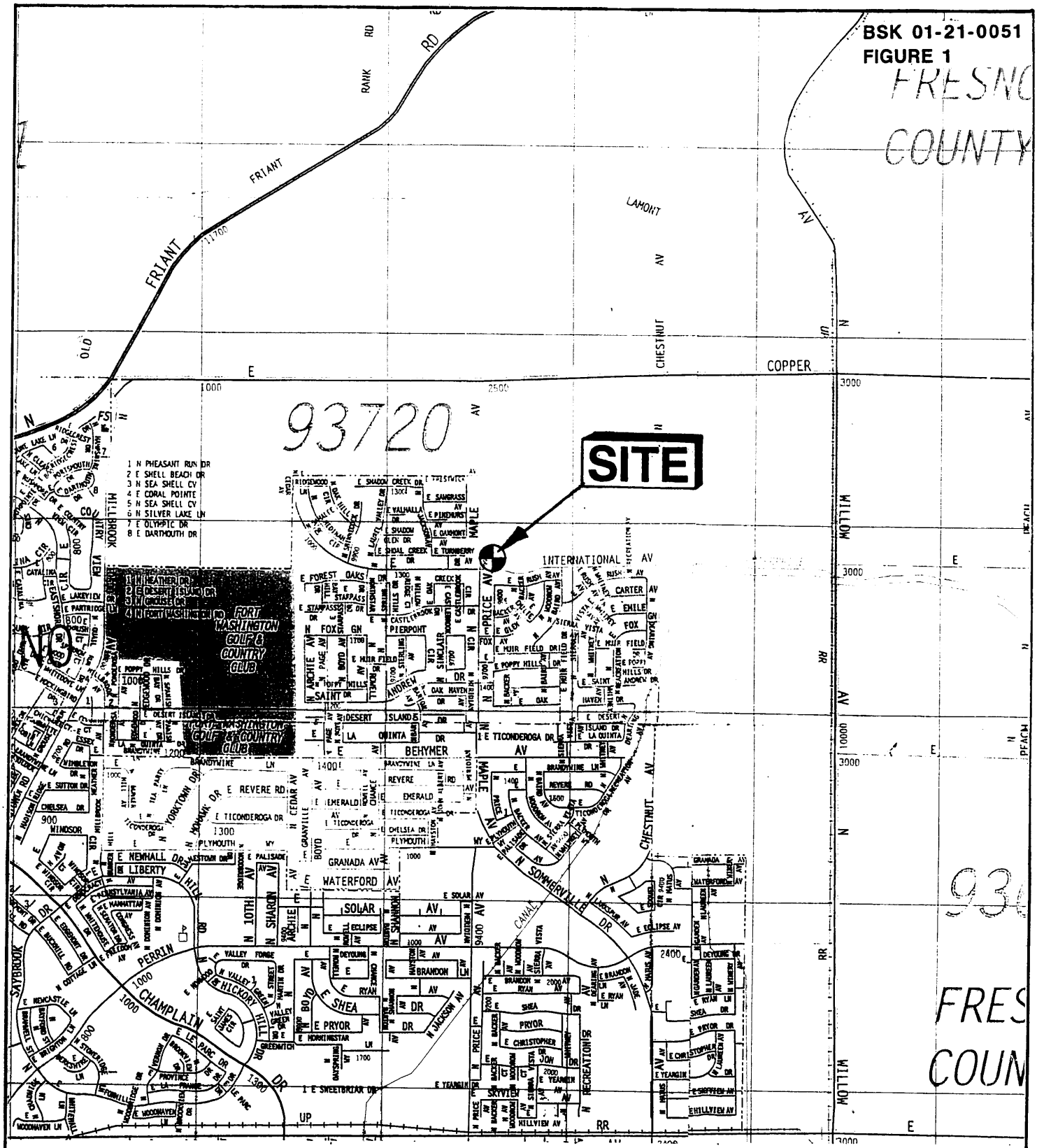
The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of Client and Client's project design consultants. The report has been prepared in accordance with generally accepted geotechnical engineering practices which existed in Fresno County at the time the report was written. No other warranties, either express or implied, are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

BSK Associates

BSK 01-21-0051
FIGURE 1



VICINITY MAP

New Fire Station No. 21
NEC of International & Maple Avenues
Fresno, California

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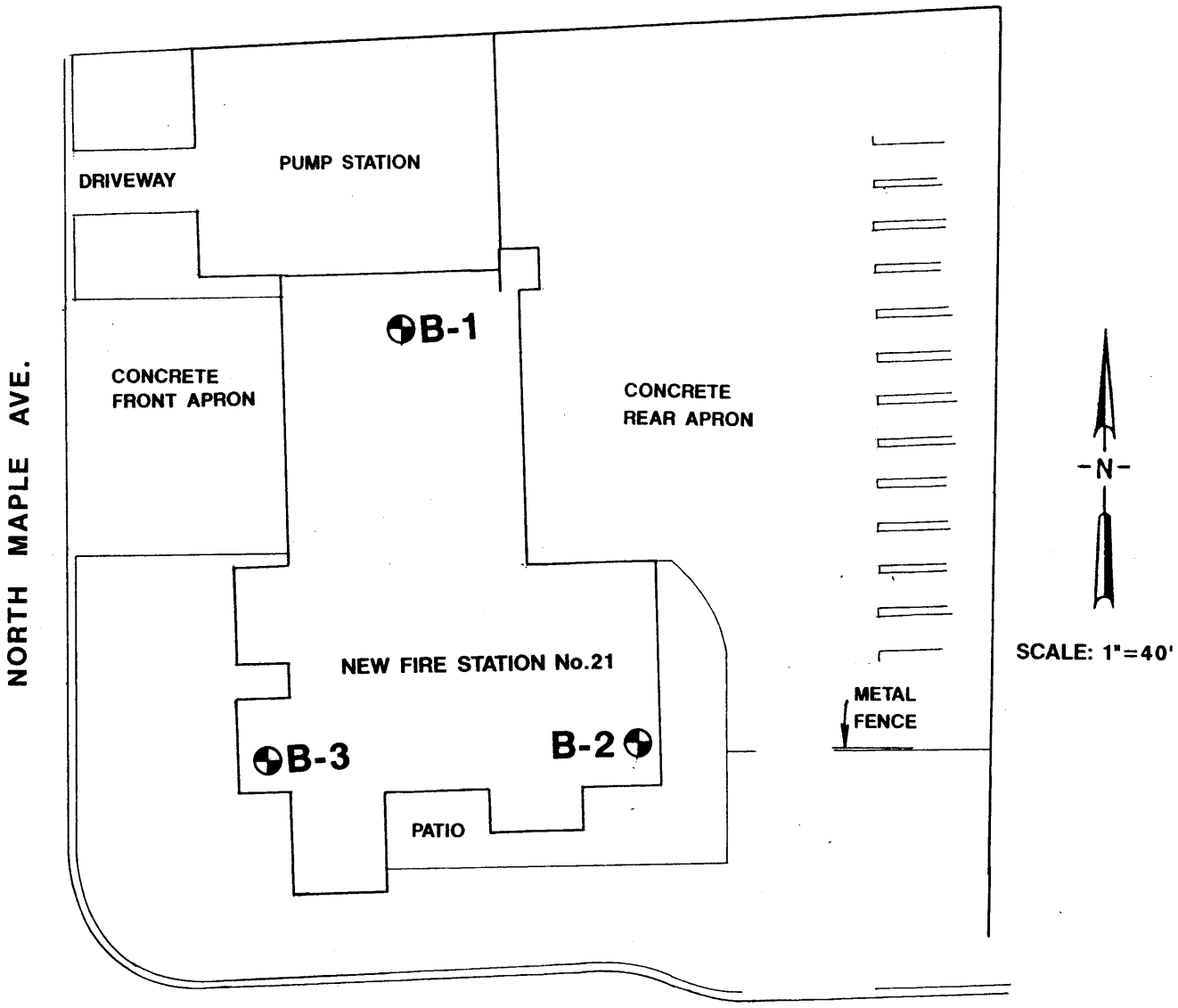
FIGURE 2



REFERENCE: FAXED SITE PLAN
BY CITY OF FRESNO

LEGEND

B-1 APPROXIMATE LOCATION OF BORING

BORING LOCATION MAP

New Fire Station No. 21
NEC of International & Maple Avenues
Fresno, California

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APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

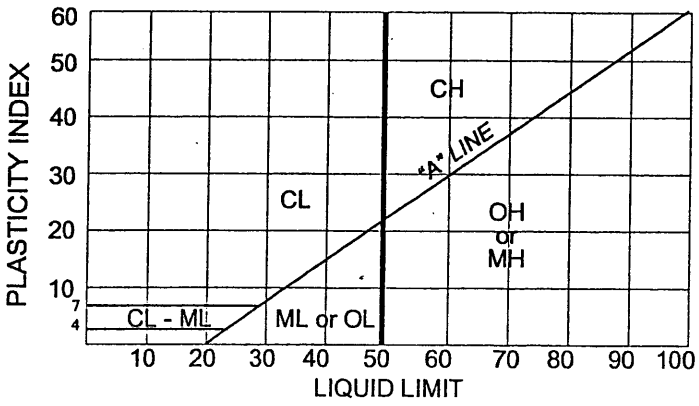
BSK has performed the field exploration on November 6, 2002 under the oversight of a BSK senior project engineer. The borings were excavated at the approximate locations indicated on the Site Plan, Figure 1. The borings were advanced using a Mobile B-57 equipped with a hollow-stem auger to depths explored of 50.5 and 25.5 feet below the existing ground surface (bgs).

The soil materials encountered in the boring were visually classified in the field, and logs were recorded by the senior project engineer during the drilling and sampling operations. Visual classification of the materials encountered in the boring was made in general accordance with the Unified Soil Classification System (ASTM D2487). Stratification lines were approximated by the staff engineer on the basis of observations made at the time of drilling while the actual boundaries between different soil types may be gradual and soil conditions may vary around the boring.

Relatively undisturbed subsurface soil samples were obtained at the successive depths shown on the boring log by driving samplers which consisted of a 3.25-inch O.D. California Modified sampler and 2.25-inch Standard Penetration Test (SPT) sampler. Soil samples obtained using the California Modified Sampler were marked solid (under Sample Type); SPT samples are marked X. Soil samples were returned to the BSK geotechnical laboratory for further evaluation and testing. At the completion of the field exploration, the borings and trenches were backfilled with the soil cuttings, as set forth in BSK's proposal. Groundwater was not encountered in the boring.

METHOD OF SOIL CLASSIFICATION
(Unified Soil Classification System)

MAJOR DIVISIONS		SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than ½ of soil >No. 200 sieve size)	**GRAVELS** (More than ½ of coarse fraction > No. 4 sieve size)	GW		Well graded gravels or gravel-sand mixtures, little or no fines
		GP		Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM		Silty gravels, gravel-sand mixtures, little or no fines
		GC		Clayey Gravels, gravel-sand-silt mixtures
	SANDS (More than ½ of coarse fraction < No. 4 sieve size)	SW		Well graded sands or gravelly sands, little or no fines
		SP		Poorly graded sands or gravelly sands, little or no fines
		SM		Silty sands, sand-silt mixtures
		SC		Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than ½ of soil < No. 200 sieve size)	**SILTS & CLAYS** **LL < 50**	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL		Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS **LL > 50**	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH		Inorganic clays of high plasticity, fat clays
		OH		Organic clays of medium to high plasticity, organic silty clays, organic silts



PLASTICITY CHART

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567 W. Shaw Ave.
Fresno, CA 93704
(559)-497-2880
(559) 497-2886 FAX

Log of Boring B-1

Proposed Fire Station No. 21
Fresno, California

Sheet 1 of 1
Job Number: 01-21-0051
Elevation: n/a

Driller: BSK Associates
Start Date: 11/06/02
Drill Method: B-57 - w/8" hollow stem auger
Finish Date: 11/06/02
Sample Method: 3.25" OD & 2.25" OD Cal Mod Sampler
Logged By: J. Montes
Borehole Diameter: 8"
Water Level: Not encountered
Checked By: J. Minney

Depth (feet)	Sample Type	Blow Count (blows/ft.)	Dry Density (pcf)	Moisture (%)	Graphic Log	Materials Description	Elevation (feet)	Remarks
0						**Silty SAND (SM)** Dark brown.		
4		30	117	8.1		**Silty SAND (SM)** Reddish brown, moist, medium dense.		
10		26				**SAND (SP)** Yellowish brown, moist, medium dense.		
14		35						
20		26						
24		55				Yellowish brown, moist.		
26						Boring terminated at 25.5' No groundwater encountered.		
30								

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(559) 497-2886 FAX

Log of Boring B-2

Proposed Fire Station No. 21
Fresno, California

Sheet 1 of 1
Job Number: 01-21-0051
Elevation: n/a

Driller: BSK Associates
Start Date: 11/06/02
Drill Method: B-57 - w/8" hollow stem auger
Finish Date: 11/06/02
Sample Method: 3.25" OD & 2.25" OD Cal Mod Sampler
Logged By: J. Montes
Borehole Diameter: 8"
Water Level: Not encountered
Checked By: J. Minney

Depth (feet)	Sample Type	Blow Count (blows/ft.)	Dry Density (pcf)	Moisture (%)	Graphic Log	Materials Description	Elevation (feet)	Remarks
0								
2	■	41	112	5.6		**Silty SAND (SM)** Reddish brown, moist (hardpan).		
4	■	52	122	5.9		Reddish brown, moist, some gravel, medium dense.		
6								
8								
10	■	38				**SAND (SP)** Light brown, moist, medium dense.		
12								
14	■	32				Light brown, moist, gravel, rounded 1" to 2".		
16								
18								
20	■	34						
22								
24	■	57						
26						Boring terminated at 25.5' No groundwater encountered.		
28								
30								

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(559)-497-2880
(559) 497-2886 FAX

Log of Boring B-3

Proposed Fire Station No. 21
Fresno, California

Sheet 1 of 2

Job Number: 01-21-0051

Elevation: n/a

Driller: BSK Associates

Start Date: 11/06/02

Drill Method: B-57 - w/8" hollow stem auger

Finish Date: 11/06/02

Sample Method: 3.25" OD & 2.25" OD Cal Mod Sampler

Logged By: J. Montes

Borehole Diameter: 8"

Water Level: Not encountered

Checked By: J. Minney

Depth (feet)	Sample Type	Blow Count (blows/ft.)	Dry Density (pcf)	Moisture (%)	Graphic Log	Materials Description	Elevation (feet)	Remarks
0								
2	X	36				**Silty SAND (SM)** Reddish brown, moist, dense.		
4	X	47	125	6.4				
6								
8								
10	X	24	112	2.9		**SAND (SP)** Reddish brown, moist, medium dense.		
12								
14	X	26	127	2.9				
16								
18								
20	X	31	119	2.6		Some mica, some gravel, dense.		
22								
24	X	38	125	2.0		Greyish brown, damp, medium to coarse.		
26								
28						**Sandy SILT (ML)** Greyish brown, moist, hard.		
30	X	100	89	22.6				
32								

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567 W. Shaw Ave.
Fresno, CA 93704
(559) 497-2880
(559) 497-2886 FAX

Log of Boring B-3

Proposed Fire Station No. 21
Fresno, California

Sheet 2 of 2
Job Number: 01-21-0051
Elevation: n/a

Depth (feet)	Sample Type	Blow Count (blows/ft.)	Dry Density (pcf)	Moisture (%)	Graphic Log	Materials Description	Elevation (feet)	Remarks Compaction (ASTM D1557)
35	X	50	98	6.8		**SAND/Silty SAND (SP/SM)** Greyish white, with some mottled layers, damp, dense.		
37								
39	X	42	101	10.1				
41								
43								
45	X	75	106	22.4		**Sandy SILT (ML)** Grey, moist, hard.		
47								
49	X	79	124	9.9		**Silty SAND (SM)** Brown, some mica, moist, very dense.		
51						Boring terminated at 50.5' No groundwater encountered.		
53								
55								
57								
59								
61								
63								
65								

APPENDIX B

LABORATORY TESTING

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APPENDIX B

LABORATORY TESTING

Moisture-Density Tests
The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D 2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in accordance with ASTM D 2937 test procedures. The results of these test procedures are presented in the boring logs.

Consolidation Test
A consolidation test was performed on a relatively undisturbed soil specimen to evaluate compressibility and collapse potential characteristics. The test was performed in general accordance with ASTM D 2435. The test specimen was first loaded under as-received moisture content to a selected stress level and then saturated. The results of the test are presented on Figure B-1.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed samples of the on-site soils to determine the relationship of shear strength to confining pressure. The tests were performed in general accordance to ASTM D 3080. Samples were immediately sheared in field moisture conditions, except for soil samples obtained at the headworks area. A constant shearing rate of 0.01 inch per minute was utilized during the test. The results are presented on Figures B-2.

"R"-Value Tests
"R"-value tests were performed on composite soil samples 0 to 4 feet, B-3, in accordance with California Department of Transportation Test Method 301. These soil samples were obtained from an area where soils are anticipated to be excavated and used for site fill. The sample identification and results of the tests are shown Figure B-3.

Soil Chemical Analyses
The results of chemical analyses performed on one composite soil sample using California Test Methods 417, 422, and 532 are presented below.

SUMMARY OF CHEMICAL TEST RESULTS

SAMPLE ID	MIN. RESISTIVITY (Ohm-cm)	CHLORIDE (mg/Kg)	pH	SULFATE (mg/Kg)
B-3 at 0'-4'	6910	ND	6.3	13

ND = Non-detect

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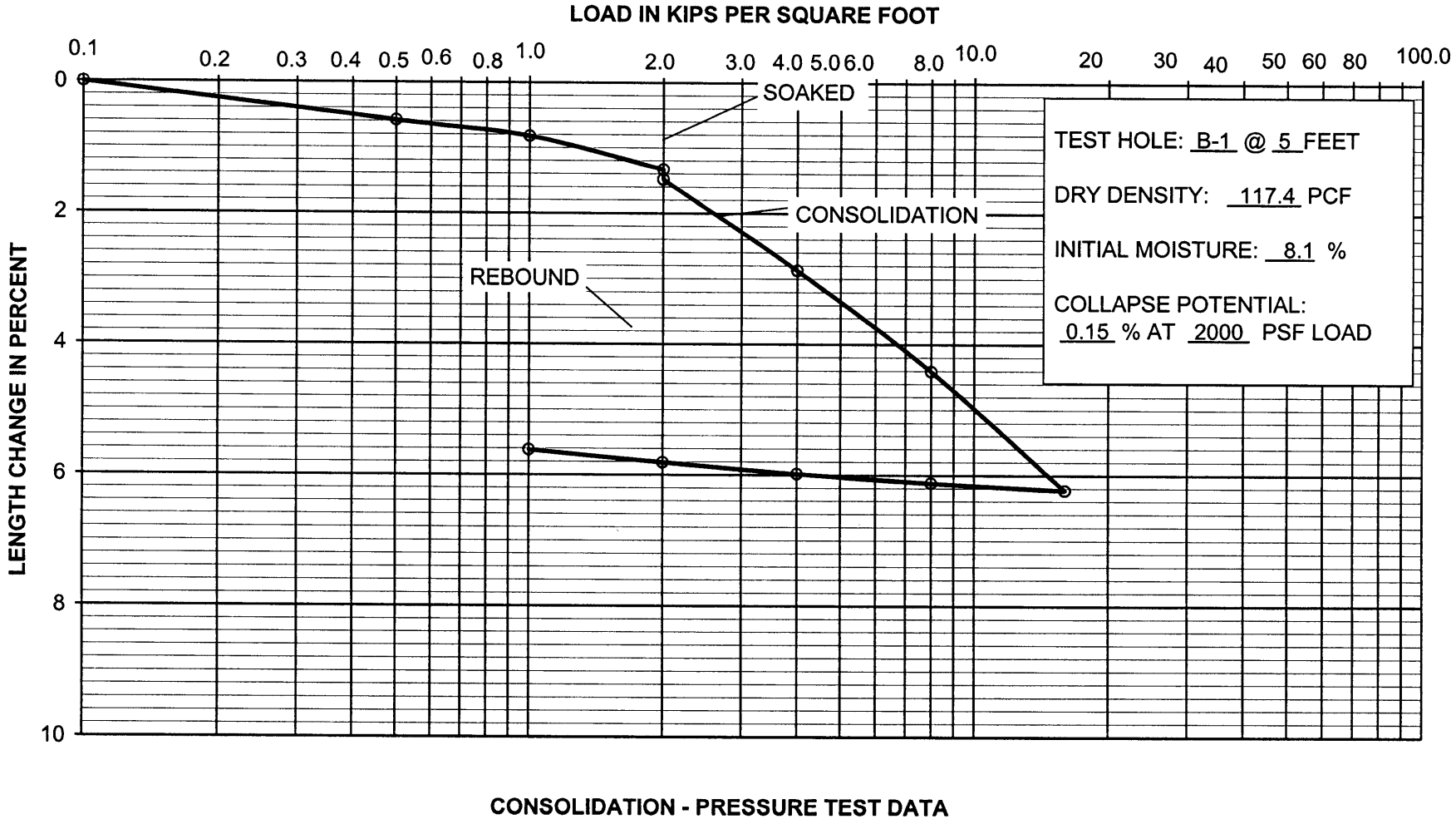
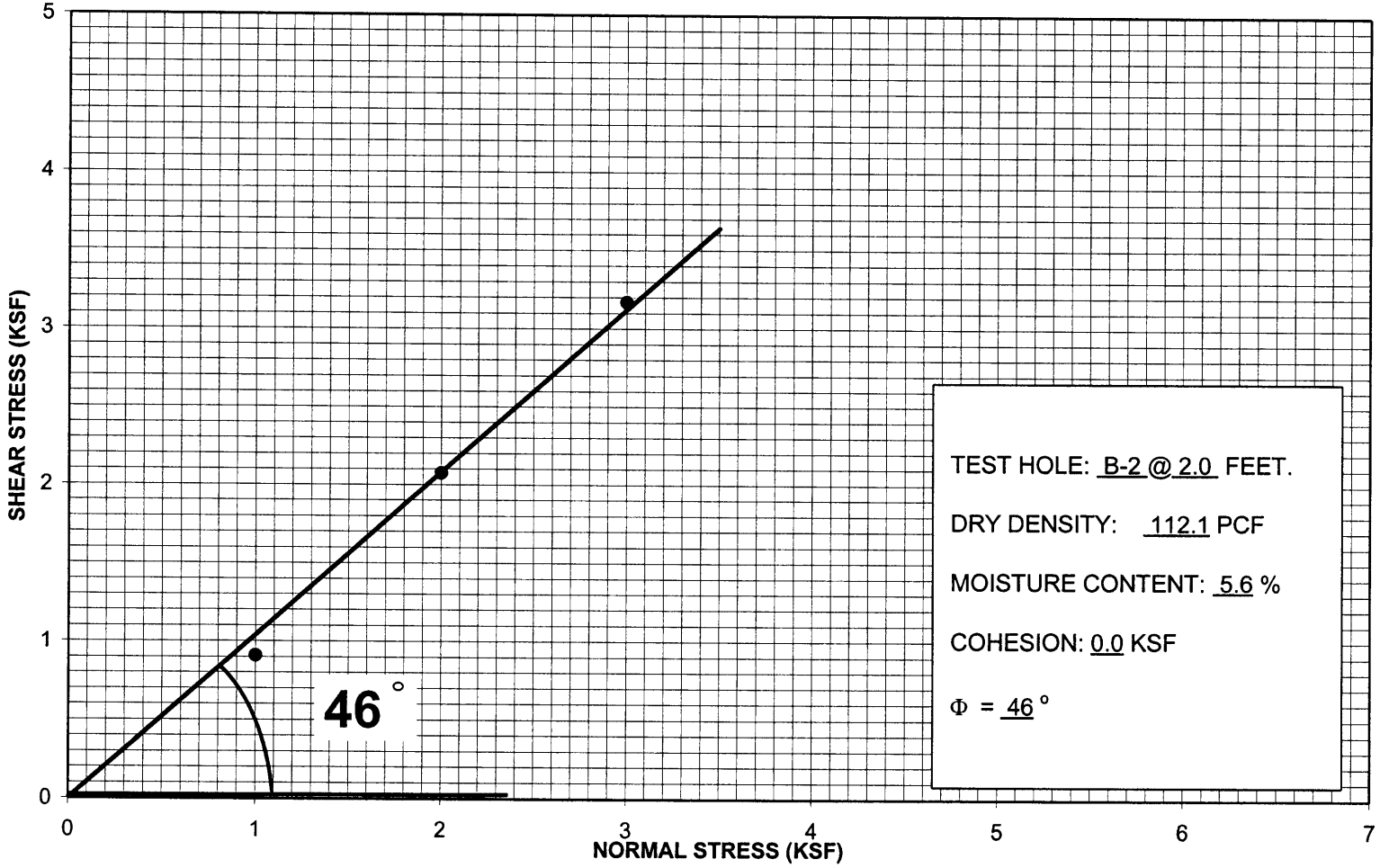
BSK 01-21-0051
FIGURE B-1



CONSOLIDATION - PRESSURE TEST DATA

BSK

SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)



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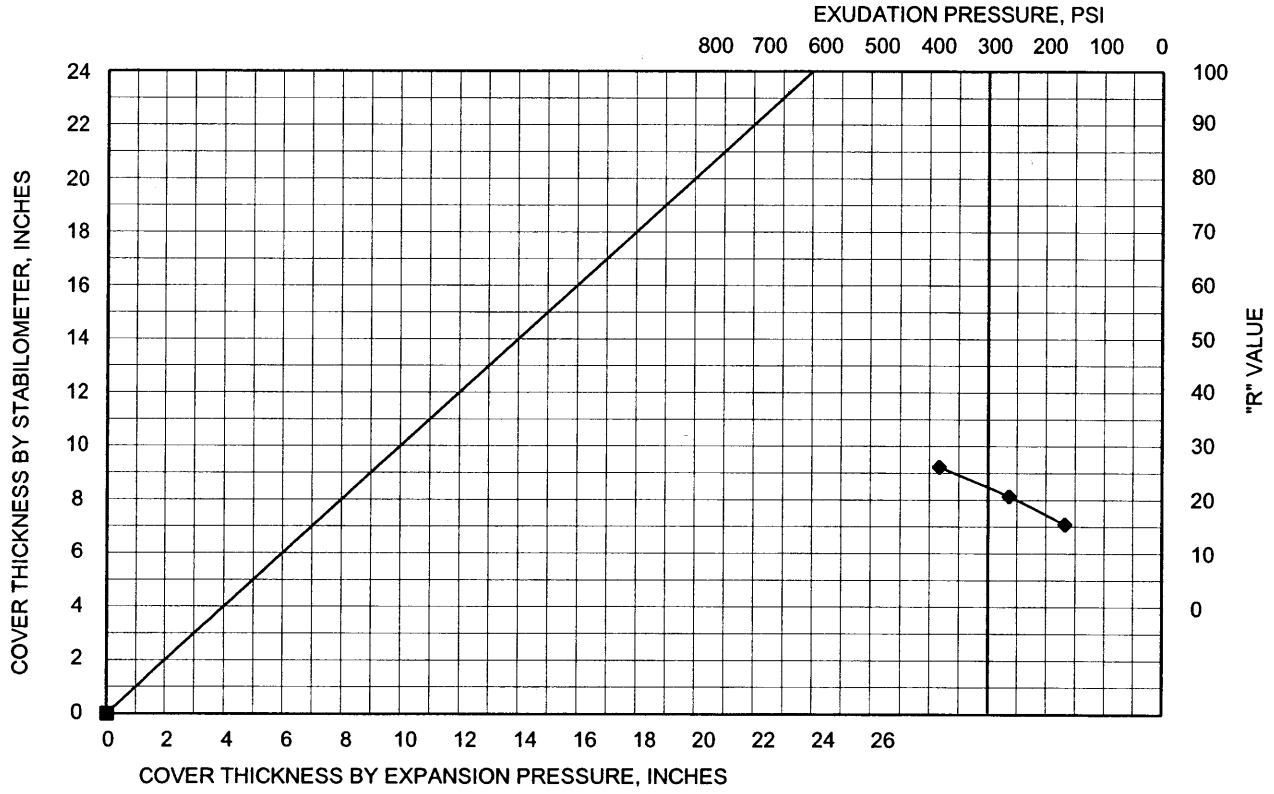
RESISTANCE VALUE TEST RESULTS
Sample No. B-1 @ 0-4'



Sample Description: Dark brown Silty SAND.

SPECIMEN	A	B	C
EXUDATION PRESSURE, LOAD (lb)	4814	3316	2102
EXUDATION PRESSURE, PSI	383	264	167
EXPANSION, * 0.0001 IN	0	0	0
EXPANSION PRESSURE, PSF	0	0	0
STABILOMETER PH AT 2000 LBS	104	114	124
DISPLACEMENT	3.81	3.87	3.98
RESISTANCE VALUE "R"	26	21	15
% MOISTURE AT TEST	8.1	8.6	9.0
DRY DENSITY AT TEST, PCF	136.0	134.8	133.1
"R" VALUE AT 300 PSI EXUDATION PRESSURE	25		
"R" VALUE BY EXPANSION PRESSURE TI=4.0, GF=1.50	NA		

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